

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 1. (Currently amended): A method for transmitting an optical signal
2 comprising:
3 receiving a transmitted optical signal as a received signal, the received signal
4 being transmitted over a first optical fiber path ~~and having at a transmitting end of the optical~~
5 ~~fiber a first power P1 and having at a receiving end of the optical fiber a second power P2,~~
6 ~~wherein $P1 > P2$;~~
7 separating the received signal to produce a plurality of bands, each separated band
8 comprising optical signals of different wavelengths; and
9 adjusting the total power of each band to make the total power of each band
10 substantially equal with each other; and
11 adjusting the power of optical signals in each band to compensate for level
12 variance among the wavelengths in the band.
13 ~~adjusting signal levels in each band to produce a plurality of adjusted bands,~~
14 ~~wherein a total power of the adjusted bands is substantially equal to P1.~~

1 2. (Currently amended): The method of claim 1 wherein the level variance
2 among the wavelengths in a band is a tilt of optical signal power, where the power of a shorter
3 wavelength signal is greater than that of a longer wavelength signal, and the step of adjusting the
4 power of optical signals includes making the power of the optical signal even among the
5 wavelengths in the band. ~~step of adjusting includes amplifying each band by a predetermined~~
6 ~~gain.~~

1 3. (Original): The method of claim 1 further including combining the
2 adjusted bands to produce a transmission signal, and transmitting the transmission signal along a
3 second optical fiber path.

1 4. (Original): The method of claim 1 further including separating each of the
2 bands to produce a plurality of second bands.

1 5. (Currently amended): Apparatus for transmitting an optical signal
2 comprising:
3 a demultiplexer having an input for receiving a transmitted optical signal as a
4 received signal, ~~the received signal being transmitted over a first optical fiber path and having a~~
5 ~~first power, P1, at a transmitting end of the optical fiber and a second power, P2, at a receiving~~
6 ~~end of the optical fiber, wherein $P1 > P2$, the demultiplexer operable to separate the received~~
7 ~~signal to produce a plurality of bands; and~~
8 a plurality of optical amplifiers coupled to the demultiplexer, each optical
9 amplifier coupled to receive one of the bands, each optical amplifier configured to output an
10 adjusted band such that ~~a~~the total power in each of the adjusted bands is substantially equal to
11 one another; and to P1.
12 a plurality of tilt controllers, each being coupled to one of the optical amplifiers.
13 each tilt controller coupled to receive one of the bands and configured to ouptou an adjusted
14 band such that the level variance for the wavelength are compensated.

1 6. (Original): The apparatus of claim 5 further including a multiplexer to
2 combine the adjusted bands to produce a transmission signal and a second optical fiber path
3 operatively coupled to the multiplexer for transmission of the transmission signal therealong.

1 7. (Original): The apparatus of claim 5 further including a plurality of
2 second demultiplexers, each second demultiplexer coupled to one of the optical amplifiers, each
3 second demultiplexer producing a plurality of second bands.

1 8. (Currently amended): A method for transmitting an optical signal
2 comprising:
3 receiving a transmitted optical signal as a received signal, the received signal
4 being transmitted over a first optical fiber path ~~and having at a transmitting end of the optical~~

5 fiber a first power ~~P1~~ and having at a receiving end of the optical fiber a second power ~~P2~~,
6 wherein ~~P1 > P2~~;

7 separating the received signal to produce a plurality of bands, each separated band
8 comprising a plurality of optical signals of some wavelengths; and

9 adjusting each band to produce a plurality of adjusted bands, including adjusting
10 signal levels in each band such that ~~a the~~ total power of each of the adjusted bands is
11 substantially equal to one another ~~P1~~ and such that, for each band, intensity levels of frequency
12 components comprising ~~the each~~ band are substantially equal thus compensating for gain tilt due
13 to stimulated Raman scattering.

1 9. (Original): The method of claim 8 further including combining the
2 adjusted bands to produce a transmission signal, and transmitting the transmission signal along a
3 second optical fiber path.

1 10. (Original): The method of claim 8 further including separating each of the
2 bands to produce a plurality of second bands.

1 11. (~~Original~~Currently amended): Apparatus for transmitting an optical signal
2 comprising:

3 a demultiplexer having an input for receiving a transmitted optical signal as a
4 received signal, the received signal being transmitted over a first optical fiber path; ~~and having a~~
5 ~~first power (P1) at a transmitting end of the optical fiber and a second power (P2) at a receiving~~
6 ~~end of the optical fiber, wherein $P1 > P2$, the demultiplexer being operable to separate the~~
7 ~~received signal to produce a plurality of bands; and~~

8 a plurality of optical amplifiers coupled to the demultiplexer, each optical
9 amplifier coupled to receive one of the bands, each optical amplifier having an associated
10 predetermined gain value to amplify its received band to produce an adjusted band such that a
11 the total power of all the each adjusted bands is substantially equal to each other; ~~and P1~~;

12 each optical amplifier further operable to amplify frequency components
13 comprising the band so that their intensity levels are substantially equal, thus compensating for
14 gain tilt due to stimulated Raman scattering.

1 12. (Original): The apparatus of claim 11 further including a multiplexer to
2 combine the adjusted bands to produce a transmission signal and a second optical fiber path
3 operatively coupled to the multiplexer for transmission of the transmission signal therealong.

1 13. (Original): The apparatus of claim 11 further including a plurality of
2 second demultiplexers, each second demultiplexer coupled to one of the optical amplifiers, each
3 second demultiplexer producing a plurality of second bands.

1 14. (Original): A method for transmitting an optical signal from a sending
2 station to a receiving station, wherein a plurality of one or more relay stations are disposed
3 between the sending station and the receiving station, the method comprising:
4 receiving a transmitted signal at one of the relay stations as a received signal;
5 separating the received signal into a plurality of bands;
6 adjusting each band to produce a plurality of adjusted bands, including at least
7 one of amplifying optical signals comprising each band in accordance with predetermined optical
8 intensity parameters and adjusting a gain tilt of each band in accordance with predetermined gain
9 tilt parameters;
10 combining the adjusted bands to produce a transmission signal;
11 transmitting the transmission signal to a second relay station or to the receiving
12 station; and
13 repeating the above steps at one or more of the relay stations.

1 15. (Original): The method of claim 14 wherein the optical intensity
2 parameters and the gain tilt parameters are determined based on transmission characteristics of
3 all spans of optical fiber disposed between the sending station, the relay stations, and the
4 receiving station.

1 16. (Original): The method of claim 14 wherein at one of the relay stations
2 the received signal is transmitted without adjusting.

1 17. (Original): A method for transmitting an optical signal from a sending
2 station to a receiving station, wherein one or more relay stations are disposed between the
3 sending station and the receiving station, the method comprising:

4 storing optical intensity parameters and gain tilt parameters in a memory store;

5 receiving a transmitted signal at one of the relay stations as a received signal;

6 separating the received signal into a plurality of bands;

7 adjusting each band to produce a plurality of adjusted bands, including at least
8 one of amplifying optical signals comprising each band in accordance with the optical intensity
9 parameters and adjusting a gain tilt of each band in accordance with the gain tilt parameters;

10 combining the adjusted bands to produce a transmission signal; and

11 transmitting the transmission signal to a second relay station or to the receiving
12 station,

13 the gain tilt parameters being determined based on transmission characteristics of
14 all spans of optical fiber disposed between the stations,

15 the optical intensity parameters being determined based on the transmission
16 characteristics of all the spans of optical fibers including for each span determining stimulated
17 Raman scattering (SRS) induced variations, occurring at a receiving end of the span, of signal
18 intensities in an optical signal based on the signal intensities of the optical signal as they occur at
19 a transmitting end of the span.

1 18. (Original): The method of claim 17 wherein determining SRS-induced
2 variations further includes computing a sum of signal intensities as they occur at a transmitting
3 end of the span for all wavelength bands which comprise the optical signal.

1 19. (Original): Apparatus for transmitting optical signals comprising a
2 sending station, one or more relay stations, and a receiving station, each relay station comprising:

3 a demultiplexer having an input portion for inputting a received optical signal and
4 an output portion for outputting a plurality of bands;

5 a plurality of optical circuits, each having an input portion for inputting one of the
6 bands, a control input portion for receiving signals representative of optical intensity parameters
7 and gain tilt parameters, and an output portion for outputting an adjusted signal produced by
8 adjusting the band in accordance with the signals received at the control input portion; and

9 a multiplexer coupled to the output portions of the optical circuits, the multiplexer
10 having an output portion for outputting a transmission signal comprising the adjusted signals
11 from the optical circuits,

12 the gain tilt parameters being determined based on transmission characteristics of
13 all spans of optical fiber disposed between the stations,

14 the optical intensity parameters being determined based on the transmission
15 characteristics of all the spans of optical fibers including, for each span, stimulated Raman
16 scattering (SRS) induced variations of signal intensity of an optical signal at a receiving end of
17 the span, the SRS induced variations being dependent on the signal intensity of the optical signal
18 occurring at a transmitting end of the span.

1 20. (Original): The apparatus of claim 19 further including a data store
2 configured to store the gain tilt parameters and the optical intensity parameters, the data store
3 operatively coupled to the optical circuits to provide the optical intensity parameters and the gain
4 tilt parameters.

1 21. (Original): Apparatus for transmitting an optical signal from a sending
2 station to a receiving station, wherein a plurality of one or more relay stations are disposed
3 between the sending station and the receiving station, the method comprising:

4 means receiving a transmitted signal at one of the relay stations as a received
5 signal;

6 means separating the received signal into a plurality of bands;

7 means for adjusting each band to produce a plurality of adjusted bands, including
8 at least one of amplifying optical signals comprising each band in accordance with one or more

9 optical intensity parameters and adjusting a gain tilt of each band in accordance with one or more
10 gain tilt parameters;
11 means for combining the adjusted bands to produce a transmission signal; and
12 means for transmitting the transmission signal to a second relay station or to the
13 receiving station,
14 the gain tilt parameters being based on transmission characteristics of all spans of
15 optical fiber disposed between the stations;
16 the optical intensity parameters being based on the transmission characteristics of
17 all the spans of optical fibers.

1 22. (Original): The apparatus of claim 21 wherein the optical intensity
2 parameters are further based on, for each span, determining stimulated Raman scattering (SRS)
3 induced variations of signal intensity of an optical signal at a receiving end of the span, the SRS
4 induced variations being dependent on the signal intensity of the optical signal at a transmitting
5 end of the span.